

REMARKS

Claims 21-34 remain in this application. Claims 1-20 have been canceled. Claims 21-34 have been added. Support for newly added Claims 21-34 can be found in Figs. 4-6 and on pages 17-18 of the specification. The specification is amended to correct certain typographical errors without adding any new matter to the application. Applicant respectfully requests reconsideration and review of the application in light of the foregoing amendments and following remarks.

Before addressing the merits of the grounds of rejection, Applicant would like to provide the following brief description of the invention. The invention relates generally to separating gases of a gaseous mixture. The separation of gases is beneficial in applications such as a combustion engine, where enriching intake air with oxygen can enable increased power and efficiency. However, separating oxygen and nitrogen from air can be problematic because oxygen only has a slightly greater electronegativity than nitrogen, and under many circumstances, oxygen and nitrogen may both be ionized negatively in the presence of an electric field or other ionizing radiation. Methods for separation often entail the use of massive and/or complex equipment, which consume large amounts of energy. Except for a few specialized industrial processes, continuous, on-demand gas separation methods that use ambient air as a feedstock are generally too expensive and/or not technically feasible for many applications.

The present invention provides an effective gas separating system that is cheaper and easier to construct than the systems known in the art. The present invention includes a plurality of single-stage modules connected together in serial fashion to form a substantially sealed passageway. Each of the single-stage modules has a collar section and a tube section, where the tube section has a tubular interior with a gas-permeable electrode disposed across the interior. The gas separating system also includes an entry port module that allows the entry of the gaseous mixture into the passageway. Separation of the gas occurs when the gaseous mixture passes through the electrodes and becomes ionized. The positively charged and negatively

charged ions propagate towards the oppositely charged electrodes and are separated when drawn through the exhaust port modules, which are connected to the ends of the passageway. Any number of modules can be used. Finer separation of the gaseous mixture can be achieved by adding more modules to form a longer passageway with more electrodes. In accordance with another embodiment of the invention, all of the modules are comprised of molded plastic, which allows the gas separating system to be lightweight and relatively inexpensive.

Double Patenting Rejections

The Examiner rejected Claims 1, 2, 4, 5, 8-12, 18, and 19 on the ground of nonstatutory obviousness double patenting over Claims 1-5, 7, 8, and 16-21 of U.S. Patent No. 6,895,945. The Examiner also provisionally rejected Claims 1-12 and 17-19 on the ground of nonstatutory obviousness-type double patenting over Claims 1, 4-7, 10-14, 17, and 18 of co-pending Application No. 11/025,761. The above claims have been canceled. This ground of rejection is therefore considered moot.

Ito et al.

The Examiner rejected Claims 1-3, 5-6, 12, and 17-19 under 35 U.S.C. § 102(e) as being anticipated by Ito et al. The Examiner also rejected Claims 4, 11, 16, and 20 under 35 U.S.C. § 103(a) as being unpatentable over Ito et al. Claims 1-6, 11-12, and 16-20 have been canceled. To the extent that the Examiner believes Ito et al. anticipates or renders obvious newly added Claims 21-34, Applicant respectfully traverses the rejections.

Ito et al. discloses a gas separation apparatus with separation electrodes attached to the ends of a chamber, and the electrodes are connected to a voltage supply. Additionally, two porous electrodes are disposed across the chamber and run parallel to each other, and these electrodes can also be connected to the voltage supply via a wire. See paragraph 0036, and Fig. 6. Ito et al. does not disclose a system

comprising a plurality of single-stage modules connected together with an entry port module and exhaust port modules in serial fashion to form a substantially sealed passageway. Because Ito et al. does not disclose the elements of Claim 21, Ito et al. fails to anticipate the claims.

Claims 22-34, which depend from Claim 21, are deemed patentable for the same reasons stated above with respect to Claim 21. Since the prior art reference fails to teach or suggest every element of Claims 21-34, Applicant respectfully submits that these claims are allowable.

Ito et al. in view of Young

The Examiner rejected Claims 8-10 under 35 U.S.C. § 103(a) as being unpatentable over Ito et al. in view of Young. Claims 8-10 have been canceled. To the extent that the Examiner believes that Young addresses any of the limitations found in newly added Claims 27-29, Applicant respectfully traverses.

Young does not disclose all of the elements found in previous Claims 8-9 or newly added Claims 27-29. The Examiner acknowledged that Ito et al. did not disclose "an entry port having a plurality of small openings into the passageway" or "a plenum chamber enclosing the plurality of small openings, the plenum chamber having a single opening to admit flow of entry gas." The Examiner attempted to cure these deficiencies by adding Young, which discloses an apparatus for separating solids from a gas. The apparatus of Young includes a perforated member of cylinder. Even if it would have been obvious to modify the entry port of Ito et al. to include the perforated member disclosed by Young, Young still does not disclose a plenum chamber enclosing the plurality of small openings. Because the combination of Ito et al. and Young does not disclose all of the elements of the claims, Claims 21-34 should be allowable.

JP 63-158,114

The Examiner rejected Claims 1-3, 5-7, and 13-15 under 35 U.S.C. § 102(b) as

being anticipated by JP 63-158,114. Claims 1-3, 5-7, and 13-15 have been canceled. To the extent that the Examiner believes JP 63-158,114 anticipates or renders obvious newly added Claims 21-34, Applicant respectfully traverses the rejections.

JP 63-158,114 discloses a gas separation method that includes electrodes and filters for separating oxygen from gas. However, JP 63-158,114 does not disclose "a substantially sealed passageway formed by connecting the plurality of single-stage modules and entry port module in serial fashion, the passageway extending between a first exhaust port module and a second exhaust port module." In Fig. 2, gas enters through filter 13, which extends across the entire width of the chamber. If the opening extends across the entire width, the passageway cannot be "substantially sealed." The reference also does not disclose the other elements of the claim, including single-stage modules, exhaust port modules, or entry port modules. Because JP 63-158,114 does not disclose all of the elements of the claim, Claim 21 should be allowable.

Claims 22-34, which depend from Claim 21, are deemed patentable for the same reasons stated above with respect to Claim 21. Since the prior art reference fails to teach or suggest every element of Claims 21-34, Applicant respectfully submits that these claims are allowable.

Dunn

The Examiner rejected Claims 1-3, 5-7, 13-15, and 17-18 under 35 U.S.C. § 102(e) as being anticipated by Dunn. The Examiner also rejected Claims 1-3, 5-7, 13-15, and 17-18 under 35 U.S.C. § 103(a) as being unpatentable over Dunn. Claims 1-3, 5-7, 13-15, and 17-18 have been canceled. To the extent that the Examiner believes Dunn anticipates or renders obvious newly added Claims 21-34, Applicant respectfully traverses the rejections.

Dunn discloses an apparatus for removing particles from an air stream that uses parallel grids that act as porous material. However, Dunn does not disclose all of the elements of Claim 21. Dunn does not disclose "a substantially sealed passageway

formed by connecting the plurality of single-stage modules and entry port module in serial fashion, the passageway extending between a first exhaust port module and a second exhaust port module.” Fig. 2 only shows a first exhaust port and not a second exhaust port, so it does not disclose all the elements of the claim. Figs. 3 and 4 show two exhaust ports, but there are also two passageways—one passageway extends from the first exhaust port to the entry port while the other passageway extends from the second exhaust port to the entry port. There is no passageway in Figs. 3 and 4 that extends between the first exhaust port and the second exhaust port. The reference also does not disclose the other elements of the claim, including single-stage modules, exhaust port modules, or entry port modules. Because Dunn does not disclose all of the elements of the claim, Claim 21 should be allowable.

Claims 22-34, which depend from Claim 21, are deemed patentable for the same reasons stated above with respect to Claim 21. Since the prior art reference fails to teach or suggest every element of Claims 21-34, Applicant respectfully submits that these claims are allowable.

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In view of the foregoing, the Applicant respectfully submits that Claims 21-34 are in condition for allowance. Reconsideration and withdrawal of the rejections is respectfully requested, and a timely Notice of Allowability is solicited. If it would be helpful to placing this application in condition for allowance, the Applicant encourages the Examiner to contact the undersigned counsel and conduct a telephonic interview.

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To the extent necessary, Applicant petitions the Commissioner for a two-month extension of time, extending to January 29, 2007, the period for response to the Office Action dated August 29, 2006. The Commissioner is authorized to charge \$225.00 for the two-month extension of time pursuant to 37 CFR §1.17(a)(2), and any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 50-0639.

Respectfully submitted,



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